SCIENCE & EDUCATION Impact

Benefits from USDA/Land-Grant Partnership

Swine Support

Promoting pork production through science and education.

The U.S. swine industry is changing rapidly. Nationally, the number of swine operations has fallen from 650,000 in 1977 to 150,000 in 1997, with almost no change in the numbers of pigs produced. As swine production becomes more concentrated, issues of waste management, pig health and the production of healthy, nutritious consumer food products become increasingly important. At the same time, profit margins have been squeezed and producers find themselves continually looking for ways to add value and cut costs.

Payoff

- **Genetic improvement.** Identifying sows with greater potential for producing larger litters would improve the financial bottom line for pork producers. **Iowa State** researchers identified three genes that influence litter size. Sows with one of the genes average of 0.5 to 0.9 more pigs per litter than sows without this advantage. Researchers developed three genetic tests to help pork producers identify which females and males have the genes to produce larger litters. Using any one of the three genetic tests in a 1,000-sow operation could mean a $12,000 to $20,000 boost in income, based on average pork prices.

- **Labor saver.** Undergraduate agricultural engineering students at **South Dakota State** designed a robot to assist in swine breeding and production and help move stubborn pigs. The robot, called a "Boar Bot," is a radio-controlled vehicle that can pull a tremendous amount of weight. It also makes swine breeding safer by reducing human handling. It won top honors at the U.S. Engineering Expo and the World Pork Expo and is slated for commercial production.

- **Cost-cutting composting.** Farmers usually dispose of dead pigs by incineration, burial or contracting with a rendering plant for pickup. Operating costs for incineration are high, and the odor can upset neighbors. Burial requires machinery costs and must be done under at least 4 feet of soil, a difficult task in frozen winter ground. Rendering plant pickups may not be timely, their vehicles could spread animal diseases from farm to farm, and they charge $20 to $35 per stop. **Ohio State** scientists found that carcasses placed in a properly managed sawdust compost pile will completely decompose and all pathogens will be killed within 180

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days. The composted material can then be spread on fields as a renewable nutrient source.

- **Quality control.** Of the nearly 6.8 million pigs marketed in Nebraska during 1998, about 72 percent were required to be certified through the Pork Quality Assurance (PQA) program. **Nebraska** Extension helped provide PQA training on science-based production techniques to avoid disease, improve pork quality and encourage high industry standards. By the end of 1998, about 1,250 Nebraska pork producers who raised nearly 1.3 million pigs annually had participated in the programs. The potential savings for participating Nebraska pork producers is about $3.16 million. Similar programs exist in **Indiana** and **Georgia.** Nationally, PQA-certified producers report decreased drug and labor costs or improved herd health and efficiencies, resulting in savings of $2 to $3 per head.

- **Manure neutralizer. Michigan State** researchers studied ozonating stored swine manure to remove odor. The team is constructing a full-scale ozonation system. Ozone, a gas used to disinfect drinking water and swimming pools, is bubbled into manure slurry where it renders it odorless by breaking apart the odor-causing molecules. It kills bacteria and greatly reduces bacterial growth. The ozonated manure slurry is environmentally safe and can be spread on fields as a fertilizer. Researchers also are following up on findings that ozonated swine manure slurry repels and kills flies. **Missouri** scientists are working on new methods of swine waste handling and management to capture plant nutrients in swine wastes and return them to the farm. This should save $1,700 to $6,500 per farm on typical Missouri family swine farms. **Purdue** researchers found that manure from pigs fed a low-protein soyhull diet supplemented with synthetic amino acids contained two-thirds to half as much nitrogen. It also smelled better because ammonia emission dropped by a third or more. Pigs gained weight less efficiently but were leaner and less costly for Indiana producers to feed.

- **Puny placenta produces plenty of pigs.** American hog breeds have litters averaging 9 to 10 pigs. Chinese Meishan sows average 12 to 14 pigs per litter. **Iowa State** researchers compared the reproductive systems of Meishan sows with American Yorkshire sows and found that placentas of Meishan sows are smaller but more efficient, providing more room for the piglets. Researchers determined small-placenta Yorkshire sows gave birth to three more pigs than those that produced large placenta. The increase of a single pig per litter would allow the swine industry to produce the same number of pigs from 10 percent fewer litters. Such a reduction in the breeding herd would save the industry nearly $32 million a year in feed costs.

- **Feeding trials. Arkansas** animal scientists are working on reducing pork quality defects thought to have cost the industry $100 million in 1998. They found that supplementing magnesium-mica in the diets of growing-finishing swine improves color scores without hurting live animal performance. It may also produce leaner carcasses with a higher percent of muscle. A computer model developed by **Purdue** and **Kansas State** allows pork producers to cut feed costs by tailoring diets to growth stages and pig type. Researchers estimate that producers can save an average $1.50 per pig using the program. These tailored diets also can reduce nitrogen and phosphorus excretion.

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United States Department of Agriculture

Cooperative State Research, Education, and Extension Service in cooperation with the Extension Committee on Organization and Policy, the Experiment Station Committee on Organization and Policy, the Academic Programs Committee on Organization and Policy, the International Programs Committee on Organization and Policy, and the Louisiana State University Agricultural Center.

April 2000